**Ontario Institute for Studies in Education**

**OISE/UT**

**University of Toronto**

**Additional Basic Qualification**

**Intermediate Division Science- General**

#### COURSE CODE:EAQ1301Y-S-7001

#### COURSE OF STUDY

SUMMER 2009

Thursday July 2 - Thursday July 23

8:00 AM – 1:30 PM

Instructors: Jeany Ellis & Janine Extavour

**1. COURSE DESCRIPTION**

Science 1301 consists of a series of lectures, seminars, laboratory workshops, and field trips designed to emphasize the objectives, methodology, and content of science at the Intermediate Division (grades 7-10 inclusive). It is based on the Ministry of Education and Training; ***The Ontario Curriculum Grades 1-8: Science and Technology (2008); The Ontario Curriculum Grades 9 & 10 science (2008); The Ontario Curriculum Grades 9 & 10: program Planning and Assessment, Grades 9 & 10 (1999);*** and the ***Council of Ministers of Education, Canada: Common Framework of Science Learning Outcome, Pan-Canadian Protocol for Collaboration on School Curriculum.*** The course examines the essential learning outcomes/expectations and objectives of science education, teaching/learning strategies, and assessment and evaluation strategies and tools. It also focuses on the standards of practice for the teaching profession as they pertain to Science Education at the Intermediate Division using the reference from the Ontario College of Teachers titled, ***Standards of Practice for the Teaching Profession, November 19, 1999.***

**2. TIME ALLOCATION**

The instructor will meet with groups and individuals during monitored time to facilitate discussions, and to assist with planning, assignments, research and whatever issues arise.

**Contact Time**

**100h**

**Classroom Contact**

**80h**

**Monitored Contact**

**20h**

**Total Time**

**125h**

**Non-Contact Time**

**25h**

* Presentation research
* Planning
* Lab materials testing
* Group meetings
* Peer assessment
* Classes, labs, field trips
* Presentations
* Group seminars
* Assessment
* Preparation of presentations
* Internet research
* Library services
* Meetings with instructor

**3. REFERENCE TEXTS, RESOURCE BOOKS, AND DOCUMENTS**

There is no required textbook for the course. All the texts listed on the Trillium List of curriculum resources can be used. This is available online along with a guide to using the list (<http://www.edu.gov.on.ca/eng/teachers/teachers0406.html>). It is expected that candidates will become familiar with the variety of materials (periodicals, internet, videos, books, demonstrations) that can be used in teaching science, as a component of the course assignments.

**4. EVALUATION**

The final grade in this course is based on several evaluations. Please refer to the Grading Framework (Section 8, p. 8) for general expectations and descriptions of achievement levels that will be applied to all assignments. The assignments are described in more detail below and in the assessment tools provided.

|  |  |  |  |
| --- | --- | --- | --- |
| **Assignment** | **Weighting** | **Due date** | **My mark** |
| “Play to your strengths” Presentation | 10% | July 3,6 |  |
| Concept Workshop | 20% | July 13-17 |  |
| Unit Plan – all 3 revised parts | 40% | July 20 |  |
| Lab Practical (practical test and ongoing) | 20% | July 21, |  |
| Metacognitive Journal | 5% | ongoing |  |
| Participation | 5% | ongoing |  |
| TOTAL | 100% |  |  |

**1. “PLAY YOUR STRENGTHS” PRESENTATION**

**10% of the overall grade; 10 minute presentation**

Each teacher is an individual who brings different strengths and weaknesses to their classroom. As in any situation, you are more assured of success if you play your strengths. In this assignment, you will share something you know/ can do well with the other class participants in the context of teaching intermediate science.

## Evaluation Scheme

|  |  |  |
| --- | --- | --- |
| **Criteria** | **Achievement Chart Category** | **Marks** |
| Presentation is engaging and interesting: mechanisms to inspire and maintain interest are used appropriately (e.g. a “hook”, props, demonstrations, humour, manipulables, hands on, discussion, etc.) | C | 0 1 2 |
| Participants are actively involved in presentation, either by trying it themselves or through discussion or other interaction(s) | I | 0 1 2 |
| Links to the appropriate intermediate (7-10) curriculum are highlighted: explanations are clear and detailed, including how the skill or idea presented can be used in the classroom in a meaningful way | KU | 0 1 2 |
| Presentation is organized and easy to follow; presenter monitors participants for understanding and success to support and enhance flow of the presentation; within the 10 minute maximum including questions | C | 0 1 2 |
| One page summary is provided and posted to the course website, and includes at least 2 resources suitable to support other teachers who may not be familiar with the skill/idea | KU | 0 1 2 |
| TOTAL |  | /10 |

**2. CONCEPT WORKSHOP**

**20% of the overall grade (200 points); 60-minute presentation**

In pairs, you will research resources to teach a concept chosen from the Grade 7 to 10 curriculum, planning and implementing a workshop presentation on the **teaching of the concept.** As part of the workshop, you will present the background required design an inquiry assessment activity and design the tool(s) for assessing the inquiry activity. The 60-minute time allotment for the concept workshop includes the inquiry activity and the presentation of assessment. The inquiry activity can occur where it best fits at any time during the concept workshop.

1. **Presentation** (125 points; ~30 min)

The presentation should be an overview of the concept, and identify resources, activities and demonstrations for **teaching the concept** to intermediate level students. The presenter will identify some of the key areas of difficulty. The presenter will describe or demonstrate teaching strategies for helping to overcome student difficulties. Concrete materials and visual aids should be used to enhance the presentation. The presenter will distribute an outline (maximum 10 pages, double spaced) of the presentation to peers and the instructor. All handouts must be included as part of the 10 pages.

An electronic copy must be posted to the course conference.

1. **Inquiry Activity** (75 points; ~20-30 min)

The presenter will design and peers will participate in an activity that meets some of the Inquiry expectations of the topic (e.g. hands on lab activity, computer simulation). The concept presenter will design and present an appropriate tool(s) for assessing understanding of the concept, using achievement chart categories. This may be a separate page, and must also be posted to the course website.

**Evaluation Scheme: See “Instructor Rating Scale for Concept Workshop” (p. 9)**

Peers will give written feedback using “Recommendations to Concept Workshop Leader” sheets (p. 10).

Presenter will, following the presentation and feedback stage, provide a one-page self-reflection of concept workshop that incorporates feedback from instructor and peers.

Workshop presenters will submit the following to the instructor:

1. A copy of the concept presentation outline (10-page handout) and the inquiry assessment tool(s).
2. “Recommendations” Feedback Sheets of colleagues **within two class days** of the concept workshop.
3. Reflection sheet based on instructor and peer feedback.

**NOTE:** Students are required to meet with the instructor prior to their presentation to submit a materials request (equipment list) and to discuss their progress and any questions. It is expected that co-presenters will divide the work equally and will be held equally responsible for the quality of the written work. Presentation skills will be evaluated separately.

**3. UNIT PLAN**

**40% of the overall grade; Written assignment composed of: Unit Overview, Issue Analysis, and Rich Performance Task**

For the Unit Plan, you will prepare an overview and two major assignments for one of the units of study from the Ministry of Education and Training ***The Ontario Curriculum Grades 1-8: Science and Technology (2008)*** or ***The Ontario Curriculum: Grades 9 & 10: Science, (2008).* The final product produced for the unit plan can have no more than 20 pages of print (or 10 pages double sided).** The final revised product must be posted to the course website.

Due to the scale of this assignment, you will meet with the instructor on a weekly basis for troubleshooting, to monitor your progress, and to receive feedback.

1. **Unit Overview** (20% of overall grade)

You will prepare a logical sequence of the expectations for a unit, divide these into sections for lessons, list valid strategies to achieve the expectations. You will also list valid and varied assessment tools to assess the achievement of the expectations. You must also justify (explain your reasoning behind) the sequence of expectations, and the strategies and assessment tools that you identify. Pick a format that will make the overview easy to use (e.g. a table outlining the lessons, with justifications explained in prose afterwards).

You must also list at least three alternate conceptions (misconceptions) and how these could be resolved, as well as a teaching challenge and an appropriate strategy to resolve it.

**Evaluation Scheme: See Intermediate Science Rating Scale: Unit Overview (p. 11)**

1. **Rich Performance Task and Assessment Tools** (10% of overall grade)

You will prepare a Rich Performance Task (e.g. culminating activity) to be used at the end of the unit to assess students’ ability to integrate key expectations for the unit. This task is real-world and performance-based, and should include 4-6 expectations from the unit of study. All four categories of the achievement chart should be incorporated (Knowledge/ Understanding, Inquiry, Communication, Application).

* Describe the performance task and context of the assignment via a student handout to be given to the student when the task is introduced (Maximum: 2 pages)
* Break the task down into manageable steps, as it would be explained to the students
* Provide assessment tools to be used to assess the **process** of doing the task as well as the evaluation of the final **product**. The tools must include one scoring rubric and/or rating scale.

Evaluation Scheme: See “Scoring Rubric: Rich Performance Task and Assessment Tools” (p. 12)

1. **Issue Analysis and Assessment Tools** (10% of overall grade)

You will create a task designed for students to analyze an issue pertinent to the unit of study and prepare valid assessment tools to assess the achievement of the expectations for this issue analysis. The emphasis should be higher order thinking skills.

**What is Issue Analysis?**

## An issue is a problem with two or more possible resolutions, any one of which may be satisfactory to some members of society. In researching the issue, students should consider guiding principles of STSE: ethics, decision-making, power, action, social responsibility and social justice.

Each Issue Analysis includes 2 main sections: the Scenario/ Assignment and the Implementation Plan/ Assessment Tools.

i) Scenario/Assignment: (maximum: 500 words)

Describes the issue, it’s context, and background information, allowing students to complete the task or find the information required. Different stakeholders and their positions/perspectives should be identified.

The Assignment lets the students know how they are to work with the issue. Some alternatives include role-play, debate, media presentation, or position paper. Diverse skills should come into play, such as decision-making process or skills, affective domain questions, higher order thinking skills, psychomotor tasks.

ii) Implementation Plan/ Assessment Tools:

The detailed implementation plan should be a series of lesson plans (2-3 lessons) with a level of detail that illustrates how the STSE Issue Analysis will be introduced, managed, and assessed in class. This includes a list of all resources, handouts in ready to use form, instructions for students and a minimum of two different assessment tools.

The assessment tools must assess both the **process** and the **product** of the Issue Analysis. The assessment tools must include one scoring rubric and/or rating scale.

**Evaluation Scheme: See “ Scoring Rubric: Issue Analysis Assignment” (p.13)**

1. **Revising and Sharing Resources**

You will revise the above materials based on the instructor’s comments where required before uploading to the course website.

## Unit Plan Evaluation Outline

|  |  |  |
| --- | --- | --- |
| **Component** | **Weighting (of overall mark)** | **Due by** |
| Meet with instructor | Counts towards participation | ongoing |
| Unit Overview | 20% | July 10 (draft July 7) |
| Rich Performance Task and Assessment Tools | 10% | July 16 |
| Issue Analysis and Assessment Tools | 10% | July 20 |
| Uploaded copy of revised materials |  | July 22 |
| TOTAL | 40% | July 22 |

**4. LAB SKILLS PERFORMANCE ASSESSMENT**

**10% of overall grade; ongoing performance of lab skills and a final lab skills practical exam (July 21)**

A practical lab skills assessment will be held near the end of the course to assess familiarity with key inquiry and psychomotor skills associated with Intermediate Division Science that have been demonstrated and practiced throughout the course. Components of the assessment include safety, care and maintenance of equipment, and effective performance of laboratory skills. (Reference: Lab Practical Skills Assessment, p. 14)

**5. METACOGNITIVE JOURNAL**

**5% of overall grade; in class and out of class journal writing**

During the course, you will be asked to respond to specific questions as a part of your journal. The intent of this exercise is to model and experience the value of metacognitive activities during the learning process, particularly as a reflective practitioner. Submissions will be marked based on completion and the general ICE model rubric below.

|  |  |
| --- | --- |
| Criteria | Content and Presentation |
| **Information** | Information and/ or observations contributing to reflection are included |
| **Connections** | Links are made between information and personal practice/ experience |
| **Extensions** | Applications, interpretations, conclusions, or hypotheses are proposed for the connections made. |

**6. PARTICIPATION**

**5% of overall grade; in class participation, feedback, meetings**

Participation includes 5% of your overall grade and will be awarded on the basis of your instructors’ objective judgment of the quality of your work throughout the course. These include a variety of aspects including:

**Attendance** and **active participation** in all sessions,

Constructive feedback to peers on their concept workshops,

Inquiry Assessment participation,

Self and peer evaluations,

Evidence of reflective practice (journal, assignments),

Other in-class assignments given by the instructor.

**7. LATE SUBMISSION AND ATTENDANCE POLICY**

|  |
| --- |
| **All assignments not submitted by the due dates will be penalized unless accompanied by a doctor’s certificate. Late assignments receive a maximum grade of B-.**  **In accordance with regulation 184/97 attendance at all classes is mandatory. Absences may jeopardize successful completion of the course. Please arrange all appointments outside of the course hours as listed in the calendar. If an emergency occurs that requires your absence, this must be reported to both the course principal (Cheryl Madeira cmadeira@oise.utoronto.ca) and the instructor.** |

1. **GRADING FRAMEWORK**

The following table summarizes the generic framework that will be used by your instructor to guide assessment and evaluation practices. Candidates will find this framework helpful for interpreting grades for all assignments. The levels referred to correspond to the four levels defined by the Ministry of Education.

|  |  |  |  |
| --- | --- | --- | --- |
| **Level** | **Letter Grade** | **Percentage Range** | **Description** |
| Four | A+  A  A- | 90-100  85-89  80-84 | **Work of exceptional quality.**  The content, organization and style are all at an exemplary level and move the discussion well beyond what was covered in class. The written work demonstrates excellent comprehension of the subject and, where appropriate, integrates existing research and literature. The work also demonstrates sound critical thinking, innovative ideas, and personal engagement. |
| Three | B+  B  B- | 77-79  73-76  70-72 | **Work of standard quality with no major weaknesses**  All of the required elements of the assignment are fulfilled. The writing is clear and explicit; the coverage and demonstrated comprehension of the topic is more than adequate. Some degree of critical thinking and personal involvement in the work is shown. |
| Two | C+  C  C- | 56-69  63-66  60-62 | **Work of adequate quality with some major weaknesses**  All of the required elements have been included although some conceptual inadequacies are present. a fair comprehension of the subject is demonstrated, but some weaknesses in content, style, organization, critical awareness, personal involvement and/or use of the literature is apparent. |
| One | D | 50-59 | **Work of inferior quality and some elements of the assignment are missing**  Candidates may submit the missing elements and revise and resubmit the inferior assignment to raise the grade to a MAXIMUM level of C. |
| Fail | Fx | 0-49 | **Failing Work**  The candidate needs to meet with the instructor. |

Student Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Intermediate Science**

**Instructor Rating Scale For Concept Workshop**

The letters have the following meanings: **Ex Exemplary; A Very Good; B Good; C Adequate; D Marginal; R Inadequate.** Areas of weakness have been underlined or **Highlighted** in the Description of Criteria column.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Criteria** | **Criteria Description** | **Ex** | **A** | **B** | **C** | **D** | **R** |
| PRESENTATION |  | | | | | | |
| **Organization, Sequencing & Safety** | The introduction was interesting, the presentation was logical, and safety considerations were identified and implemented. Grade, unit, and sequence (e.g. prior learning) for the unit are identified. | 20 | 17 | 15 | 13 | 11 | 5 |
| **Student Difficulties & Strategies** | Student difficulties were addressed, including those identified by the instructor, and teaching strategies, including those for overcoming  the learning difficulties were demonstrated. | 20 | 17 | 15 | 13 | 11 | 5 |
| **Creativity and Presentation Methods** | The presentation included variety, creative ideas and resources, and interesting presentation and communication methods were used. Presenter was organized, enthusiastic, poised, and showed superior teaching skills. | 20 | 17 | 15 | 13 | 11 | 5 |
| **Ability to Communicate** | The content was presented clearly and concisely, concrete materials were displayed, and demonstrated, audio-visual devices were used effectively, the command of English was superior, and the presentation was audible and well modulated. | 25 | 21 | 18 | 16 | 14 | 6 |
| **Skill in Questioning & Addressing Questions** | Clear concise questions were asked to involve peers and accurate answers were given to questions asked by peers and by the instructor. | 10 | 8.5 | 7.5 | 6.5 | 5.5 | 2.5 |
| **Scholarship** | A superior mastery of the topic was exhibited and no errors in content or methodology were evident. | 15 | 13 | 11 | 10 | 8 | 4 |
| **Pace, Emphasis and Timing** | A realistic amount of information was taught, time was spent on important details, and the workshop was completed within the allotted time. | 15 | 13 | 11 | 10 | 8 | 4 |
| **INQUIRY** |  | | | | | | |
| **Inquiry Activity** | The activity was designed to nurture inquiry and lab skills. | 15 | 13 | 11 | 10 | 8 | 4 |
| **Inquiry Implementation** | The lab materials were well organized, and the workshop leader monitored the activity appropriately. | 15 | 13 | 11 | 10 | 8 | 4 |
| **Inquiry**  **Assessment** | The inquiry assessment tool(s) was original, clear, well organized, designed to assess understanding of the concept presented**,** and was of high quality (uses achievement chart categories and is in line with overall expectations for the course). | 20 | 17 | 15 | 13 | 11 | 5 |
| **Outline** | The outline was well organized, background information, advance preparations and special materials were noted, lesson sequence was outlined, students difficulties were noted, teaching strategies, evaluation procedures, applications, societal issues and annotated references were included. The outline was equal to the specified length. The outline was posted to the course website. | 20 | 17 | 15 | 13 | 11 | 5 |
| **FOLLOW UP**  **Reflection** | Following review of instructor and peer feedback, candidate completes reflection sheet. | 5 | 4 | 3.5 | 3 | 2.5 | 0 |

**TOTAL /200 points = / 20%**

Your Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INTERMEDIATE SCIENCE**

**RECOMMENDATIONS TO CONCEPT WORKSHOP LEADER**

Presenter’s Name:

Science Concept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Note: Your feedback to the presenter will be monitored by your instructor for completeness and validity. Its quality will form part of the participation evaluation component of the course.*

1. List and describe several things that you really liked about this workshop.

2. Give several thoughtful suggestions to help the leader improve their leadership and teaching skills.

3. On a scale of 1-5, how comfortable are you teaching this concept based on the presentation given? Identify any gaps in your understanding, where you would need more support, e.g. what would bring your confidence up to a five.

**THE INSTRUCTOR WILL READ AND ASSESS YOUR COMMENTS AFTER THE LEADER HAS SEEN THEM.**

Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Intermediate Science Rating Scale: Unit Overview (20% of overall mark)**

The levels have the following meaning: Level 4 (80-100%) ; Level 3 (70-79%); Level 2 (60-69%); Level 1 (50-59%); Level R (<49%). Areas of weakness have been underlined or **Highlighted** in the Description of Criteria column.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Criteria** | **Descriptions of Criteria** | **4** | **3** | **2** | **1** | **R** |
| **Listing and Coverage of Ministry Expectations** | All of the expectations (basic concepts, inquiry and design skills, communication skills, and knowledge  of science and technology relating to the real world) are addressed. |  |  |  |  |  |
| **Lesson Sequence** | The lesson sequence is valid and realistic. |  |  |  |  |  |
| **Logic of sequence of Expectations** | The chronological sequence of topics is logically defended and justified (based on prior knowledge, concrete to abstract, format, etc.) |  |  |  |  |  |
| **Learning Strategies**  **for Expectations Sequence** | The listed learning strategies are interesting, varied, and have a performance based component. The learning strategies are valid for helping students achieve the Ministry expectations. |  |  |  |  |  |
| **Logic of Learning Strategies** | Choice of learning strategies is logically defended  and justified. |  |  |  |  |  |
| **5 Assessment Strategies** | An appropriate collection and variety of assessment tools have been listed. The tools are valid for assessing the achievement of the Ministry expectations. |  |  |  |  |  |
| **Logic of Assessment Strategies** | Choice of assessment strategies is logically defended and justified. |  |  |  |  |  |
| **Alternate Conceptions** | Three alternate conceptions for the unit (i.e. misconceptions) are clearly identified and appropriately addressed. |  |  |  |  |  |
| **Teaching Challenge** | A teaching challenge for the unit is clearly described and an appropriate strategy for resolution is  suggested. |  |  |  |  |  |

**Comments:**

Mark out of 20:

**/20**

Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Scoring Rubric: Rich Performance Task and Assessment Tools (10% of overall grade)**

The levels have the following meaning: Level 4 (80-100%); Level 3 (70-79%); Level 2 (60-69%); Level 1 (50-59%); Level R (<49%). Your score out of 50 points will be determined using the most consistent level and multiplying 50 by the following conversion factors: Level 4 (0.90); Level 3 (0.75); Level 2 (0.65); Level 1 (0.55); Level R (0.25).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Level 4** | **Level 3** | **Level 2** | **Level 1** | **Level R** |
| **Rich Performance Task** | | | | | |
| **Creativity and Originality** | The task demonstrates outstanding creativity and originality. | The task demonstrates average creativity and originality. | The task demonstrates adequate creativity and originality. | The task demonstrates barely adequate creativity and originality. | The task demonstrates inadequate creativity and originality. |
| **Clarity and Organization** | The task demonstrates outstanding clarity and organization | The task demonstrates average clarity and organization | The task demonstrates adequate clarity and organization | The task demonstrates barely adequate clarity and organization | The task demonstrates inadequate clarity and organization |
| **Potential to Validly Assess the Expectations** | The task demonstrates outstanding potential to validly assess the expectations | The task demonstrates average potential to validly assess the expectations | The task demonstrates adequate potential to validly assess the expectations | The task demonstrates barely adequate potential to validly assess the expectations | The task demonstrates inadequate potential to validly assess the expectations |
| **Quality and Authenticity** | The task demonstrates outstanding quality and authenticity | The task demonstrates average quality and authenticity | The task demonstrates adequate quality and authenticity | The task demonstrates barely adequate quality and authenticity | The task demonstrates inadequate quality and authenticity |
| **Assessment Tools** | | | | | |
| **Variety, Creativity, Originality and Quality of Tools used to Assess Task** | The assessment tools demonstrate outstanding variety, creativity, originality and quality | The assessment tools demonstrate average variety, creativity, originality and quality | The assessment tools demonstrate below average variety, creativity, originality and quality | The assessment tools demonstrate barely adequate variety, creativity, originality and quality | The assessment tools demonstrate inadequate variety, creativity, originality and quality |
| **Validity of Assessment tools used to Assess Task** | The assessment tools demonstrate outstanding potential to validly assess the components | The assessment tools demonstrate average potential to validly assess the components | The assessment tools demonstrate below average potential to validly assess the components | The assessment tools demonstrate barely adequate potential to validly assess the components | The assessment tools demonstrate inadequate potential to validly assess the components |

**Comments:**

Mark out of 10:

**/10**

Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Scoring Rubric: Issue Analysis Assignment (10% of overall mark)**

The levels have the following meaning: Level 4 (80-100%); Level 3 (70-79%); Level 2 (60-69%); Level 1 (50-59%); Level R (<49%). Your score out of 50 points will be determined using the most consistent level and multiplying 50 by the following conversion factors: Level 4 (0.90); Level 3 (0.75); Level 2 (0.65); Level 1 (0.55); Level R (0.25).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Level 4** | **Level 3** | **Level 2** | **Level 1** | **Level R** |
| **Issue Analysis Description and Questions/Tasks** | | | | | |
| **Quality of the Scenario and Potential for Motivating Students** | The scenario demonstrates an outstanding structure, clarity, background information and potential for motivating students. | The scenario demonstrates average structure, clarity, background information and potential for motivating students. | The scenario demonstrates below average structure, clarity, background information and potential for motivating students. | The scenario demonstrates barely adequate structure, clarity, background information and potential for motivating students. | The scenario demonstrates inadequate structure, clarity, background information and potential for motivating students. |
| **Quality of the Assessment Strategy.** | Questions/tasks are appropriate for grade level and topic and include higher order thinking skills. They include at least 2 affective domain questions/ tasks and at least  1 psychomotor domain task. | One of the level 4 items is missing. | The questions/ tasks encourage little higher order thinking; missing the required number of questions. | More than one of the domains of questions/tasks is missing; questions are unclear, higher order thinking  skills are not addressed. | The questions/ tasks are inadequate/ inappropriate. |
| **Implementation Plan** | | | | | |
| **Plan, Strategies, and**  **Resources for Implementing the Issue Analysis** | The timeline, references, teaching/learning strategies and resources for implementing the issue analysis are outstanding. | The timeline, references, teaching/learning strategies and resources for implementing the issue analysis are average. | The timeline, references, teaching/learning strategies and resources for implementing the issue analysis are below average. | The timeline, references, teaching/learning strategies and resources for implementing the issue analysis are barely adequate. | The timeline, references, teaching/learning strategies and resources for implementing the issue analysis are inadequate. |
| **Assessment Tools** | | | | | |
| **Tools Used to Assess the Issues Analysis Components and Each Individual’s Achievement** | The tools demonstrate outstanding creativity, originality, quality and potential to validly assess the components, processes, and individual achievement. | The tools demonstrate average creativity, originality, quality and potential to validly assess the components, processes, and individual achievement. | The tools demonstrate  below average originality, quality and potential to validly assess the components, processes, and individual achievement. | The tools demonstrate barely adequate creativity, originality, quality and potential to validly assess the components, processes, and individual achievement. | The tools demonstrate inadequate creativity, originality, quality and potential to validly assess the components, processes, and individual achievement. |

Mark out of 10:

**/10**

### Comments:

**COURSE EXPECTATIONS**

By the end of the course, a candidate in Science 1301 will:

**CONTENT MASTERY:**

* + - 1. Demonstrate a mastery of the science content of key topics of the Intermediate Division by his/her participation in seminars and workshops, including appropriate learning expectations; major concepts, principles and laws; skills of inquiry and communication; and relating science to technology, society and then environment.
      2. Identify the processes involved in experimental design and how to develop these in students;
      3. Demonstrate an understanding of developing science skills in students;
      4. Follow correct SI practice when working with physical quantities and outline strategies for teaching these practices; describe appropriate procedures for handling numerical answers in exercises involving physical quantities: precision, accuracy, and significant digits and implement a logical format for solutions to numerical problems;
      5. Address ethical issues in science courses;

# EQUIPMENT & SKILLS MASTERY

* + - 1. Demonstrate knowledge and understanding of equipment used to teach Science in the Intermediate Division including: properly store and safely use equipment and supplies, identify hazards and implement proper safety procedures in the classroom, diagnose problems with and correctly operate science equipment. Equipment and supplies include electrical equipment, glassware, microscopes (slide preparation, stains), Bunsen burner, hot plates, flora and fauna on field trips and in the science classroom;
      2. Demonstrate a mastery of WHMIS and safe procedures in a science laboratory and how to instill, develop, and assess these in students;
      3. Demonstrate a mastery of estimation, measurement, and scientific drawing skills using the compound microscope and assessing these skills in students;
      4. Carry out a terrestrial and aquatic field study involving the measurement and analysis of abiotic and biotic factors to determine overall ecosystem quality;
      5. Demonstrate mastery of various lab skills and equipment used in the Intermediate Division, including: make and identify various gases in the lab; measure volume and mass and determine density; mix solutions of specified concentration.

## LAB PRACTICAL SKILLS ASSESSMENT

The lab practical will be used to assess the knowledge of and facility with the key lab skills associated with Intermediate Division Science:

* + - 1. Measure linear dimensions, volume and mass using appropriate equipment and the appropriate number of significant digits.
      2. Make calculations, such as volume, density, and velocity accurately, using the correct number of significant digits.
      3. Convert values to scientific notation and vice versa.
      4. Determine amounts of substances required to make solutions of specific percent by mass and percent by volume concentrations.
      5. Determine pH using litmus and universal pH paper.
      6. Conduct appropriate chemical tests to identify oxygen, hydrogen and carbon dioxide.
      7. Use simple graphs to describe motion in one dimension.
      8. Perform tests on soil and rock samples to classify their qualities.
      9. Measure mass and volume and calculate the density of a substance using appropriate equipment.
      10. Use a microscope to identify the various stages of the cell cycle.
      11. Prepare, observe and make a labeled, scientific drawing of a specimen.
      12. Estimate the size of a specimen in micrometers.
      13. Design, draw and assemble series and parallel circuits for a given purpose and measure current, potential difference at various points in the circuit using appropriate instruments and SI units.
      14. Demonstrate refraction and measure the angle of refraction.
      15. Identify celestial bodies using a star chart.

# RESOURCE MASTERY

* + - 1. List suitable student and teacher resources (texts on the Trillium List, handbooks, experiment manuals, readers, A-V materials, teacher’s guides, journals, periodicals, computer hardware and software) applicable to ***Ontario Curriculum Grades 1-8: Science and Technology (2008) and Ontario Curriculum Grades 9 & 10 Science (2008);***
      2. Evaluate the potential of various learning resources for nurturing the expectations in the ***Ontario Curriculum: Grades 1-8, Science and Technology (20088)*** and the ***Ontario Curriculum: Grades 9 and 10 Science (2008);***
      3. Use periodical indexes and electronic resources to conduct a search for teaching ideas and materials pertaining to contemporary issues at the Intermediate Division;
      4. Identify, select, and use appropriate, good quality resources for lesson openers, lesson support and to develop exemplary science lessons;

# CURRICULUM DEVELOPMENT

* + - 1. Develop an effective instructional unit overview, issue analysis and rich performance task for use by teachers in the Intermediate Division.
      2. Research, design and implement an in-service teacher workshop on a science topic for peers, to demonstrate how to teach a key concept in the Intermediate Science curriculum;
      3. Describe strategies and resources for integrating science across the curriculum;
      4. Demonstrate an understanding of various authentic and performance-based assessment strategies by identifying and selecting appropriate assessment strategies that allow students to demonstrate various components of learning (knowledge, lab skills, communication, relating science to technology, society, and the environment, etc.)

# STANDARDS OF PRACTICE

* + - 1. Demonstrate knowledge of and proficiency with the standards of practice for the teaching profession as delineated by the Ontario College of Teachers in the materials titled ***Ethical Standards*** ***for the Teaching Profession*** ***Standards of Practice for the Teaching Profession (June 2006).*** (<http://www.oct.ca/standards/standards.aspx?lang=en-CA>)
      2. List, describe, evaluate, and implement appropriate strategies to ensure equality, nurture literacy, meet needs of students’ different learning styles, and encourage more engagement in the science classroom, such as: cooperative learning strategies; learning styles theory (4MAT), Multiple Intelligences, Mind Maps, and Concept Attainment.

##### COLLEGE OF TEACHERS LEARNING EXPECTATIONS

The Standards of Practice for the Teaching Profession and the Ethical Standards for the Teaching Profession have been embedded in the learning expectations for the Additional Basic Qualification course: Science – General. This Additional Basic Qualification course has the following learning expectations for candidates:

* + - 1. Understanding and implementing Ministry of Education curriculum expectations and Ministry of Education and district school board policies and guidelines related to the adolescent
      2. Having the theoretical understanding and foundation necessary to design, implement and assess programs for the adolescent learner
      3. Understanding how to use, accommodate and modify expectations, strategies and assessment practices based on the developmental or special needs of the adolescent
      4. Creating learning environments conducive to the intellectual, social, emotional, physical, linguistic, cultural, spiritual and moral development of the adolescent
      5. Working collaboratively with in-school personnel, parents/guardians and the community
      6. Accessing a variety of resources, including technological resources, within and beyond the educational system to enhance and support student learning
      7. Demonstrating an openness to innovation and change
      8. Inquiring into practice through reflection, active engagement and collaboration.